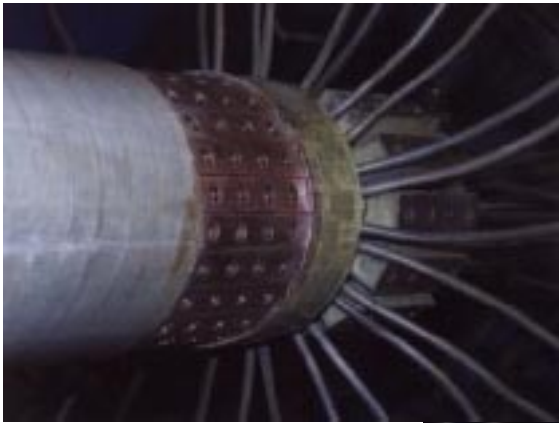


Hotline

The Princeton Plasma Physics Laboratory is a United States Department of Energy Facility

NSTX Moves Ahead

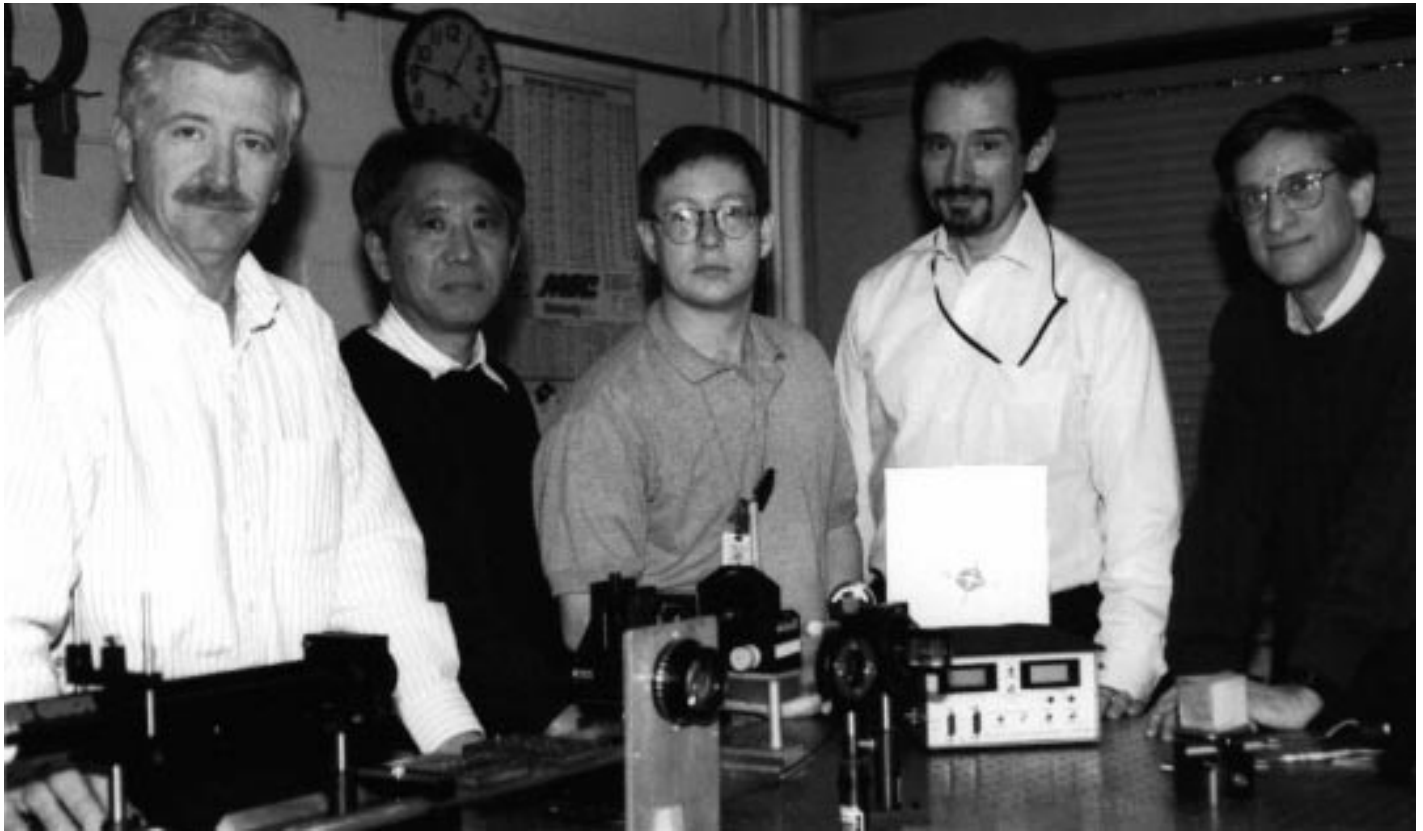


Photos by:
Tom Meighan and Elle Starkman



Construction of the National Spherical Torus Experiment (NSTX) is moving forward at PPPL. The experiment is a joint project among PPPL, Oak Ridge National Laboratory, Columbia University, and the University of Washington at Seattle, with PPPL having primary responsibility for the project and coordination of its design. The experiment, expected to begin operation in 1999, will test the physics principles of spherical torus plasmas. Clockwise from bottom left: (1) Last fall, the Test Cell was cleared to make way for NSTX. (2) The lower half of the toroidal field (TF) center stack. The prong-like objects are cooling tubes that will be straightened out and then nested between the contact pads. (3) Representatives of the Department of Energy, PPPL, and Everson Electric look over the ohmic heating tension tubes. From left are DOE's John Sauter, Everson Electric's Greg Naumovich, NSTX Project Director Masayuki Ono, DOE representative Jeff Hoy, and PPPL Procurement Head Rod Templon. (4) The NSTX Test Cell in its present state. The three cylinders at the back are high-voltage enclosures for the neutral beam line at right. (5) A mold at Everson Electric in Allentown, Pennsylvania, for the machine's TF center stack.

PPPL Funded for Textile Research Collaboration



PPPL staff involved in the AMTEX project are (from left) Dennis Mansfield, Hideo Okuda, Mark Cropper, Phil Efthimion, and Stewart Zweben. The laser device is on the table in front of Efthimion. Not pictured is Lewis Meixler.

By Anthony De Meo

PPPL will receive \$700,000 in fiscal year 1998 under a recently established Cooperative Research and Development Agreement (CRADA) between the Laboratory and the Princeton Textile Research Institute. The agreement is part of the American Textile Partnership (AMTEX) — a government-industry consortium which includes many of the nation's leading textile and apparel

manufacturers. Under the terms of the CRADA, Laboratory staff will develop state-of-the-art optical techniques for the on-line characterization of synthetic fibers during production.

“The AMTEX Partnership provides PPPL scientists with the opportunity to apply technology developed in

Continued on page 3

HOTLINE

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AMTEX

Continued from page 2

magnetic fusion research to help solve a significant industrial problem in the near-term. We are pleased to join our colleagues from other DOE-supported laboratories participating in AMTEX," noted PPPL Director Rob Goldston.

PPPL's Dennis Mansfield is the Principal Investigator on the CRADA. He will be joined by Phil Efthimion and Stewart Zweben, who will act in administrative capacities, and Hideo Okuda, who will be involved in theoretical and numerical work on the project.

Said Mansfield, "There will be an enormous economic benefit, if we can monitor and control the characteristics of synthetic fibers such as nylon and dacron on-line during the manufacturing process. Substantial time and money will be saved by eliminating the need to stop production to remove samples for off-line laboratory analysis." PPPL scientists also expect to expand greatly the number of fiber properties that can be measured.

On-line measurement of the physical and chemical properties of textile fibers will allow process adjustments to be made immediately — a substantial advantage. It is anticipated that vastly improved process reproducibility, efficiency, and quality control will result, eliminating the

over-production presently needed to insure an adequate supply of fiber with consistent characteristics.

For years, PPPL scientists have used sophisticated lasers operating in the infrared, visible, and ultraviolet wavelength ranges to study the properties of hot ionized gases — high-temperature plasmas in which fusion reactions occur. The PPPL staff will now apply these well-developed research tools to help textile manufacturers.

Light Scattered from Textiles

Specifically, laser light will be scattered from textiles during and immediately following solidification of the extruded fibers, as well as during the drawing process. During these processes, the fibers are moving at speeds up to 30 miles per hour. The light scattered from fibers under these conditions contains important information about the physical and chemical make-up of the polymer under investigation.

Mansfield noted, "Whatever instrument comes out of this work will have to function in the difficult environment of a factory floor; it will, therefore, have to be robust. In this regard, making delicate measurements on a factory floor presents many of the same challenges that arise in the environment of a fusion device. We hope to be able to exploit the revolutions which are currently taking place in the fields of laser physics, modern optics, and computer science to meet these challenges." ●

Princeton University Wins \$305,000 DOE Grant

PPPL's Nathaniel Fisch to Head Effort to Advance Study of Inertial Confinement Fusion

The U.S. Department of Energy (DOE) announced last month the award of a multi-year research grant, valued at \$305,000, to Princeton University to carry out experimental studies of high-energy plasmas and how they interact with laser pulses. The research will support DOE's advanced studies of inertial confinement fusion.

PPPL's Nathaniel Fisch will lead the Princeton team examining how electrons are transported and magnetic fields are generated when a very short laser pulse collides with a pre-heated, pre-compressed plasma. This study of plasma effects during "fast ignition" of fusion reactions will help scientists understand and model ultraintense laser/matter interactions.

Thirteen other research grants, with a total worth of \$5.2 million over three years, were awarded in a new research effort in high-energy-density science as part of the department's Inertial Confinement Fusion program. Initial funding of \$2 million has been appropriated for fiscal year 1998. Average funding for a winning proposal is about \$143,000 a year for two- and three-year programs

of work. The 14 grants will support the work of professors and students at 16 universities, as well as researchers from one private company, in 11 states and the District of



Nathaniel Fisch

Columbia. At least 10 post doctoral associates and 13 graduate students will receive support from the grants. "The work that will come out of these grants will add to our basic knowledge of physics, and help to train future scientists and engineers," said Dr. Victor H. Reis, Assistant Secretary of Energy for Defense Programs. "Both of those goals are compatible with our long-term plan to maintain the safety and reliability of the nation's nuclear stockpile without further nuclear testing." ●

Women of Color Dinner



Princeton University's fifth annual Dinner in Celebration of Women of Color was a hit. The March 5 dinner and evening of entertainment drew several PPPL'ers, as well as Princeton University staff and friends. Above is the group from the Laboratory, including, from left, Teresa Greenberg (back to camera), Mary Ann Brown, Sue Murphy-LaMarche, co-organizer Pamela Lucas, Arlene White, Linda Harmon, and James Morgan. The Director's Minority Advisory Committee and Director's Advisory Committee on Women at the Laboratory contributed to the event.

Twenty-nine Donated Blood at PPPL Drive

A special thanks goes to the twenty-nine PPPL donors at the recent Red Cross Blood Drive at the Laboratory. Dr. John Caruso, who organized the annual drive, notes that 33 staffers signed up, and of those, 29 were able to donate. We even had a first-time donor!

In a thank-you note to Dr. Caruso from Joyce Linder of the American Red Cross Blood Services, Linder said, "Blood donors are wonderful people who give the most precious gift they have to someone they'll never meet. It's truly inspiring!"

Thanks also go to the Lab's Emergency Services staff for assisting in site preparation for the Red Cross team. ●

PPPL Hosts Regional Science Bowl



P PPL hosted 21 teams from New Jersey and Pennsylvania at the New Jersey Regional Competition of the National Science Bowl®, held at the Lab in February.

“The Science Bowl is a challenging but fun day for some of the brightest students in the area. These youngsters who excel in science and math face competition that is often steep and answer questions on a variety of topics. It makes for an exciting day,” said PPPL Science Education Program Leader Pamela Lucas.

Millburn High School won first place, but because of a scheduling conflict, is unable to avail itself of the top prize — an all-expense paid trip to Washington, D.C., to participate in the Seventh Annual National Science Bowl®. Therefore the prize goes to the second-place winner, Montgomery High School. East Brunswick High School garnered third place. Teams made up of four students, a student alternate, and a teacher who serves as an advisor and coach, participated in the competition. The students answered multiple choice or short answer questions in biology, chemistry, physics, astronomy, mathematics, and earth and computer sciences. The competition is sponsored by the U.S. Department of Energy. Above is the winning Millburn team. At right is a list of the volunteers who helped with this year’s Science Bowl. ●

Thanks, Science Bowl Volunteers

John Bennevich, PPPL	Tom McGeachen, PPPL
John Boscoe, PPPL	Robert Mika,
Ryan Caveney,	Princeton University
Princeton University	Julie Anne Morgan
Bill Davis, PPPL	Karen Ossmann, PPPL
Michael Del Corsio,	Franco Paoletti, PPPL
Stevens Inst. of Tech.	Carol Phillips, PPPL
Rose Fuchs, PPPL	Mike Pieja,
Tyana Grant	Princeton University
Mel Gensamer	Andrew Post Zwicker, PPPL
Kevin Harmon	Barbara Sarfaty, PPPL
Linda Harmon, PPPL	Joseph Smith, NJIT
Andrew Harrison	Peter Stoltz, PPPL
Matthew Harrison, GFDL	Daren Stotler, PPPL
Keith Harvest	Sean Strasburg,
Ron Hatcher, PPPL	Princeton University
Craig Helfgot,	Dan Wang,
Princeton University	Princeton University
Patrice Jean,	Dan Weitz,
Princeton University	Princeton University
Dean Jens,	Gregg Wielage
Princeton University	Patti Wieser, PPPL
Margaret King, PPPL	

Brown Receives Special United Way Award

In recognition of her outstanding qualities of leadership, enthusiasm, and dedication, PPPL's Mary Ann Brown received the United Way's second annual Gayle B. Crews Memorial Award last month.

Brown received the award during the United Way of Greater Mercer County's campaign reception at the Mercer County Park Marina on March 18. She has been involved in the Lab's annual United Way campaigns for 15 years, serving as the Campaign Chairperson for many of those years. Crews, an employee of Janssen Pharmaceutica who led two of the company's successful employee campaigns, passed away in 1995. The award was created in her memory to recognize an employee campaign coordinator who best exemplifies Crews' outstanding qualities — intelligence, dedication, compassion, and commitment to helping those in need.

Said Human Resources Head Steve Iverson, "I've personally worked with Mary Ann for the past several years on United Way efforts at the Laboratory and I can certainly vouch for her dedication, perseverance, and commitment. I can't think of any person in the Princeton area more worthy and deserving of this prestigious award."

Congratulations, Mary Ann!

Photo by Steve Iverson



Mary Ann Brown (right) receives the "Gayle B. Crews Memorial Award" at the United Way campaign reception at Mercer County Park Marina in March. Jan Sturm, last year's recipient, presented the award to Brown.



Cafeteria Catering

The Cafeteria is offering catering services for PPPL events, as well as for employees for outside activities. Catering menus are available at the Cafeteria. Menu items include breakfast buffets and luncheons, service for meeting breaks, dessert or snack times, and beverages, as well as the preparation of box lunches and special occasion cakes. Individuals may also make arrangements for personal events such as birthdays, anniversaries, retirements, showers, and picnics. Order lead times vary with the type of request, with a minimum of 24 hours for all services. If you would like to make catering arrangements or discuss your options for special events, contact Cafeteria Manager Samantha Horowitz at ext. 3350. At left is a sampling of foods available through the catering service.

PPPL and Student Team Create “Spike” the Robot

Watch out for Spike. At 130 pounds, he’s lean. And with the tenacity of a bulldog, he’s mean. He — or rather it — is a robot created by a team of students and teachers from Hopewell Valley Central High School and a few engineers including Bill Blanchard from PPPL. Last month, the PPPL/Hopewell Valley team took Spike to Rutgers University to participate in the Johnson & Johnson Mid-Atlantic Regional FIRST competition.

FIRST — For Inspiration and Recognition of Science and Technology — is a national engineering contest that immerses high school students in the world of engineering. This is the second year the Lab’s Science and Education Program sponsored the PPPL/Hopewell Valley team.

PPPL Engineer Bill Blanchard spent more than 100 hours this winter working with the students to design, construct, and test their robot, giving them an inside look at the engineering profession. “This project is good because it teaches students the practical applications of technology. They had to consider the robot’s weight, size, and height in their design, as well as the cost of the material to build it,” said Blanchard.

Spike is a combination of conduits, roller bearings, plywood, motors, pulleys, a 12-volt battery, sprockets, and aluminum plates, among other items. The amount of any one type of material was restricted to encourage the students to use their imaginations and a wide variety of materials and parts in the design of the robot.

While devoting after-school hours and weekends to the project, the PPPL/Hopewell Valley team produced the robot in a room that was formerly one of the high school’s woodworking shops. A core group of about five students worked at nearly every session, while other students participated for shorter periods. “Some of the students were really fired up. We worked just about every night after school, during weekends, and even on President’s Day,” said Blanchard.

Last month, the PPPL/Hopewell Valley team took their creation to Rutgers. Each team’s robot competed with two other robots in a hexagon-shaped playing field, complete with an eight-foot center goal and three sets of rails. The robot collected, transported,

and placed beach-ball sized balls in the center goal and on the rails to score points. During a match, each of the three teams consisted of two drivers, two advisors, and one human player.

Spike was operated by the student team in seven contests, winning first place once and second place six times. The team was ranked 22nd out of the 48 teams that participated in the three-day event. “The team was pretty happy with the contest and results, and played competitively in all our matches,” said Blanchard. The PPPL engineer said he enjoyed the competition, and noted that the project inspired at least one of the students to consider a major in mechanical engineering.

So how did the team come up with Spike for a name? “The school’s mascot is a bulldog. The students wanted to build a sturdy robot to ensure it would stand up to the rigors of competition, and they did. So Spike just seemed like a good name,” said Blanchard. ●



The PPPL/Hopewell Valley team competes at Rutgers.



The PPPL/Hopewell Valley team with their creation, Spike, at the Rutgers competition. PPPL’s Bill Blanchard is fifth from the left.